**SENIOR CHEMISTRY OLYMPIADS PRACTICAL**

1. Titration (volumetric Analysis)

P is a solution of dilute sulphuric acid that was prepared by adding some distilled water to concentrated sulphuric acid. The concentration of P is not known. You are to determine the concentration of the acid P by titrating with Q a 0.1 M sodium hydroxide solution.

1. Put P in the burette. Pipette a 25.0cm3 of Q in a conical flask. Add 2 drops of the indicator provided and titrate Q and P

Repeat your titration procedure as many times as you consider necessary to achieve at least 2 consistent results.

Tick ( ) the consistent results only in the table bellow and use the ticked values to calculate the average volume of P required to neutralize 25.0cm3 of Q

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Titration No.** | **Rough** | **ACCURATE** | | |
| **1** | **2** |  |
| Final reading |  |  |  |  |
| Initial reading |  |  |  |  |
| Volume of P used |  |  |  |  |
| Tick ( ) best values |  |  |  |  |

Summary :………………………………cm3 of Q requires …………………………….cm3 of P [12]

1. (i) P is a solution containing sulphuric acid. Q is 0.1M sodium hydroxide NaOH.

Write a balanced chemical equation for this reaction including state symbols. [2]

…………………………………………………………………………………………………………………………………..

(ii) Calculate the concentration in mole/dm3 of sulphuric acid in P.

[2]

(c) Use your answer in (b) to calculate the number of moles of sulphuric acid that reacted.

[2]

(d) Calculate the number of moles present in 25cm3 of sodium hydroxide

[2]

2. (a) you are provided with two solutions S and T containing two different salts. Carry out the following tests on S and T and record your observations as specified in the qualitative notes. Test for any gas that will be produced.

|  |  |  |  |
| --- | --- | --- | --- |
| Test No. | Test | Observation on S | Observation on T |
| 1 | To a portion add almost an equal volume of acidified barium nitrate |  |  |
| 2 | To a portion add a little amount of sodium hydroxide followed by aluminium foil and warm carefully |  |  |
| 3(a) | To a suitable portion add a little amount of sodium hydroxide until a change is seen. |  |  |
| (b) | Add excess of sodium hydroxide to a mixture in (a) |  |  |
| (c) | Allow the mixture in (a) to stand for 10 minutes |  |  |
| 4 | To a portion add almost an equal volume of sodium hydroxide and warm gently. |  |  |

[12]

**Conclusion**

The formula of anions present in S and T are ……………………………………..and……………………………..respectively.

The formula of the cations present in S and T are………………………….and …………………………respectively.

The formula of the salts are S…………………………….and T………………………………….. [6]

2(b) what caused one of the observations in test 3(c)? [2]

[20]

**ADVANCE INFORMATION**

**CHEMISTRY OLYMPIAD PRACTICAL**

**QUESTION 1**

1 Burette ………….50ml

1 Pipette …………..25m

1 conical flask

Each candidate to be provided with :

1. dropper and indicator solution (phenophtalein)

1 Pipette filler

100cm3 of solution Q

100cm3 of solution P

Solution Q is 0.1M sodium hydroxide solution and solution P is 0.1000M sulphuric acid or 0.2M HCl.

It is important to note that 25cm3 of 0.1M NaOH(solution Q) reacts with between 12.0cm3 and 13.0cm3 sulphuric acid or HCl which is solution P.

**QUESTION 2**

Each candidate to be provided with :

* solution S NH4 NO3
* solution T FeSO4
* test tube rack
* Test tubes (8)
* Red litmus paper

**NOTE**

Do not reveal the identities of S and T to the candidates.